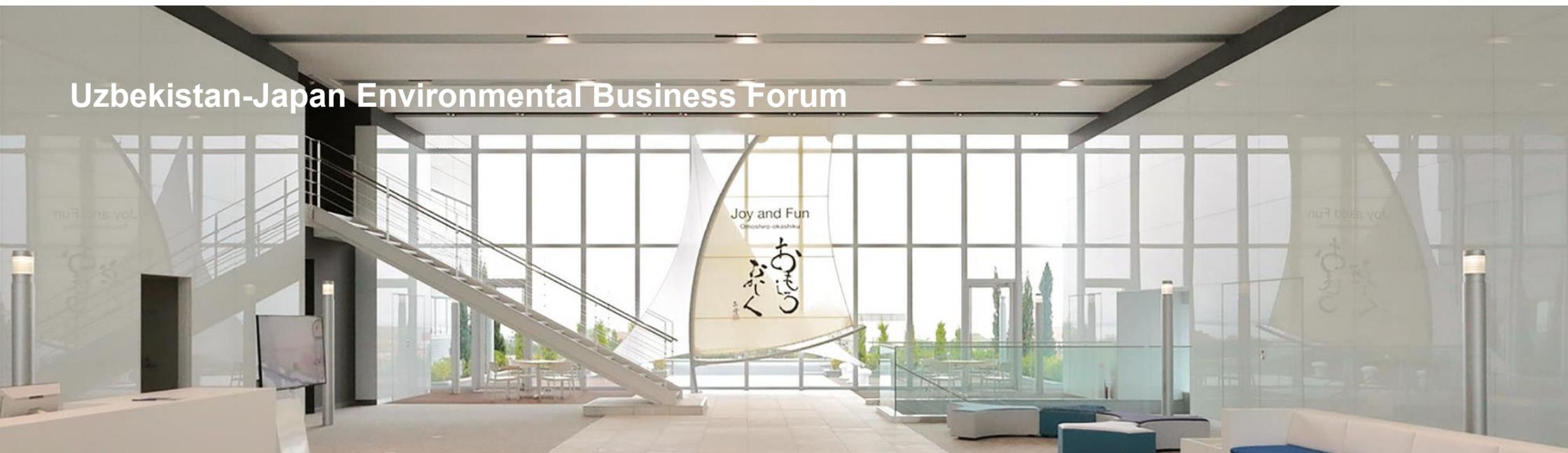


Uzbekistan-Japan Environmental Business Forum



HORIBA Measurement technology that contributes to air pollution control and CO2 capture

HORIBA, Ltd

Energy & Environment Strategy Office

Takeshi KOBAYASHI

2026/2/17

Overview

■ **Line of Business**

R&D, Manufacturing, Sales, Services of analysis and measurement equipment

■ **Head Office**

Kyoto, Japan

■ **Founded**

October 17, 1945

■ **Incorporated**

January 26, 1953

■ **Net sales**

317.3 BJPY (FY2024)

■ **Number of Employees**

8,955 (FY2024)

■ **Chairman & Group CEO**

Atsushi Horiba

■ **Fiscal Year End**

December 31

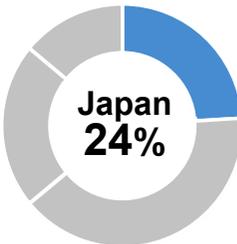
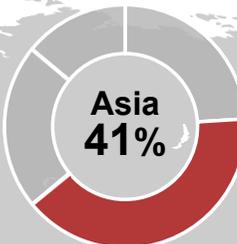
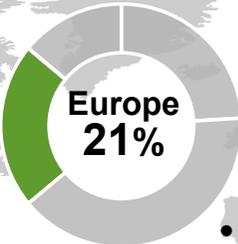


**Chairman & Group CEO
Atsushi Horiba**

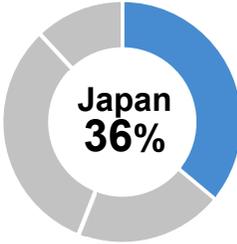
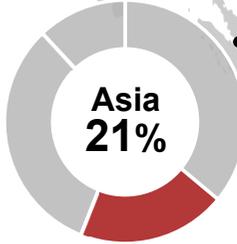
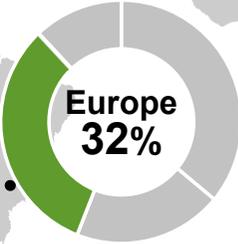
Global Network

Sales by region (as of Dec 2024)

● : Major business hubs



Employee headcount by region (as of Dec 2024)



Number of companies **47**
(as of Dec 31, 2024)



Overseas sales ratio **76%**
(as of Dec 31, 2024)



Foreign employee ratio **64%**
(as of Dec 31, 2024)

*Except for an equity-method affiliate

HORIBA Air Quality Monitoring Line-up

Applications

- Ambient air quality monitoring
- Greenhouse gas (GHG) research
- Vegetable factory

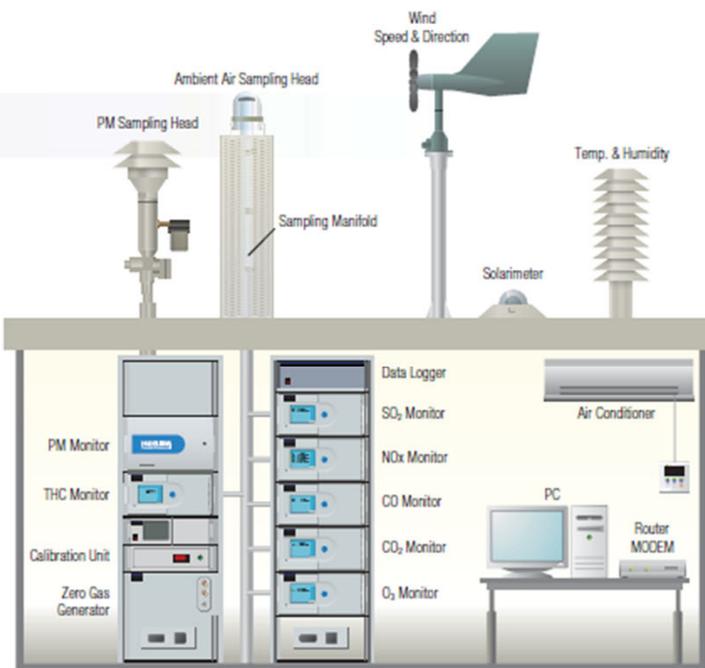
2 types of stations are available



Fixed Station



Mobile Station



Example of Air Quality Monitoring Station (AQMS)

Lineup:

NO_x Monitor: [APNA-380](#)

SO₂ Monitor: [APSA-380](#)

CO Monitor: [APMA-380](#)

CO₂ Monitor: [APCA-370](#)

O₃ Monitor: [APOA-380](#)

THC Monitor: [APHA-380](#)

PM_{2.5/10} Monitor: [APDA-372](#)

Continue Particle Monitor with X-ray Fluorescence PX-375



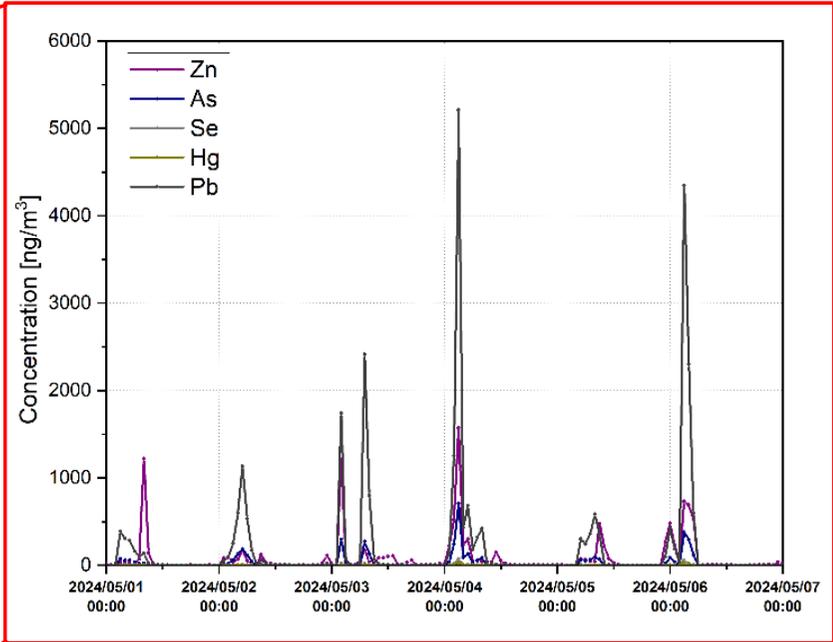
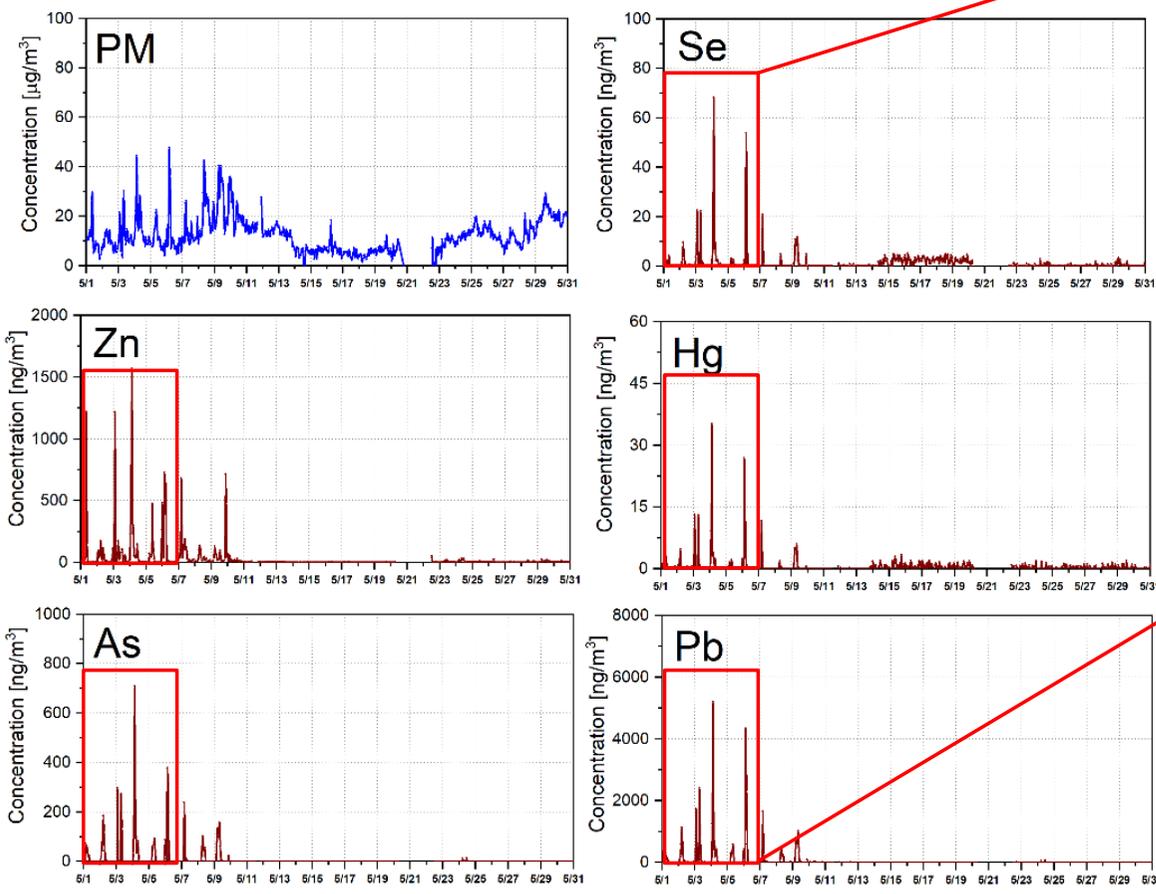
Continuous analysis of PM2.5, PM10 or TSP, mass and the elemental concentration.
 Sampling and the elemental analysis time : 30min +α

Detectable Elements (Table 2)

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra		Rf	Ha	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Unt	Fl	Unp	Lv	Uus	Uno
lanthanoid			La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
actinoid			Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

- * ○ — Standard parameters, calibrated by standard calibration materials.
- * For measurement of element concentration calibration by standard calibration materials is needed.
- * Please contact separately about elements, marked as non-detectable.

PX-375 Measurement Data



Mass occurrence every day from late at night to early morning

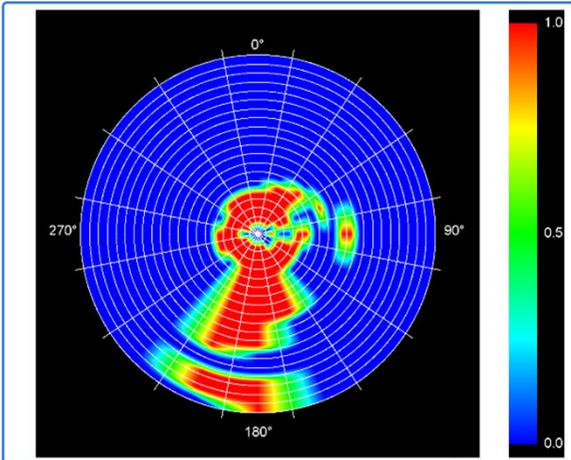
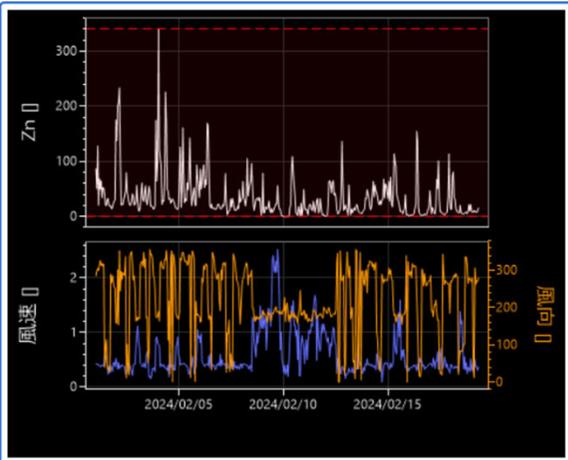
Zn As Se Hg Pb

Maybe Coal Combustion issue

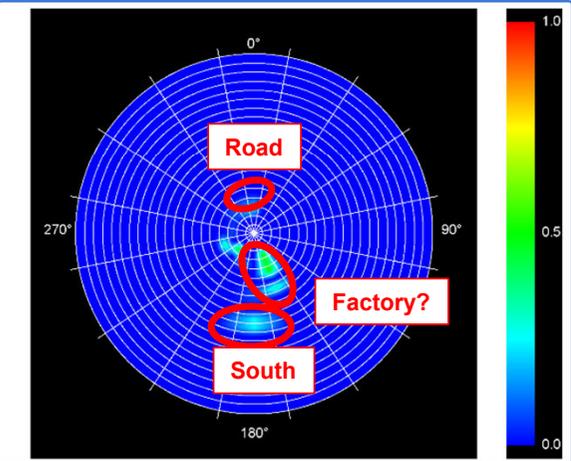
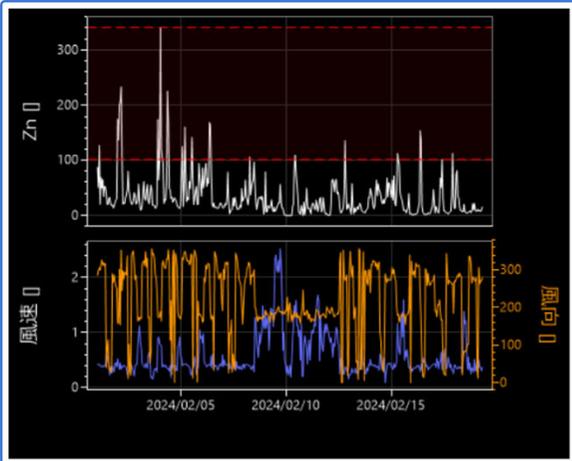
PX-375 Measurement Data

Wind direction and wind speed & Zn

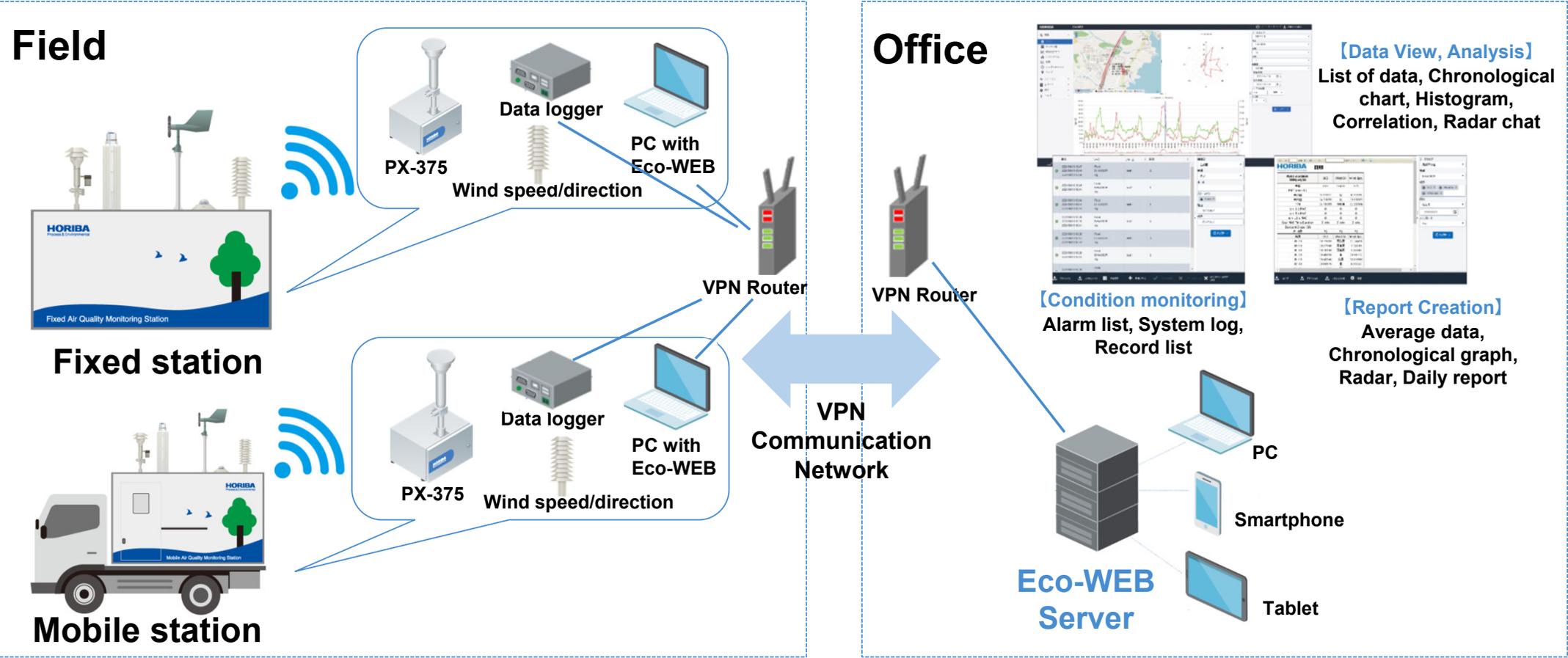
All Data



Only > 100 ng/m³



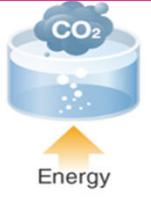
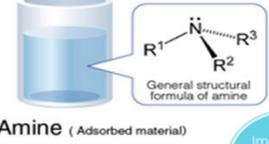
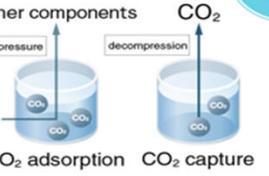
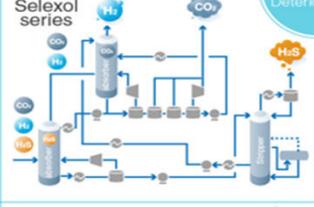
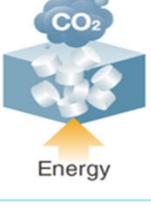
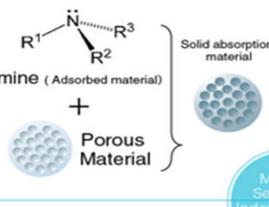
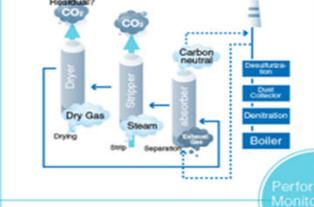
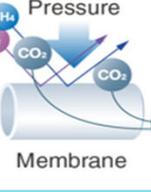
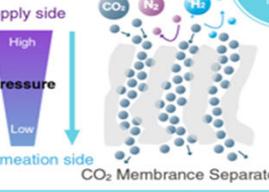
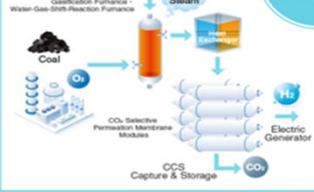
Step 6: For Feature Proposal



- Eco-WEB supports analysis of huge amount of data, visualization, creation of daily, weekly reports.
- Remote access from office, confirmation of status, alarms etc.

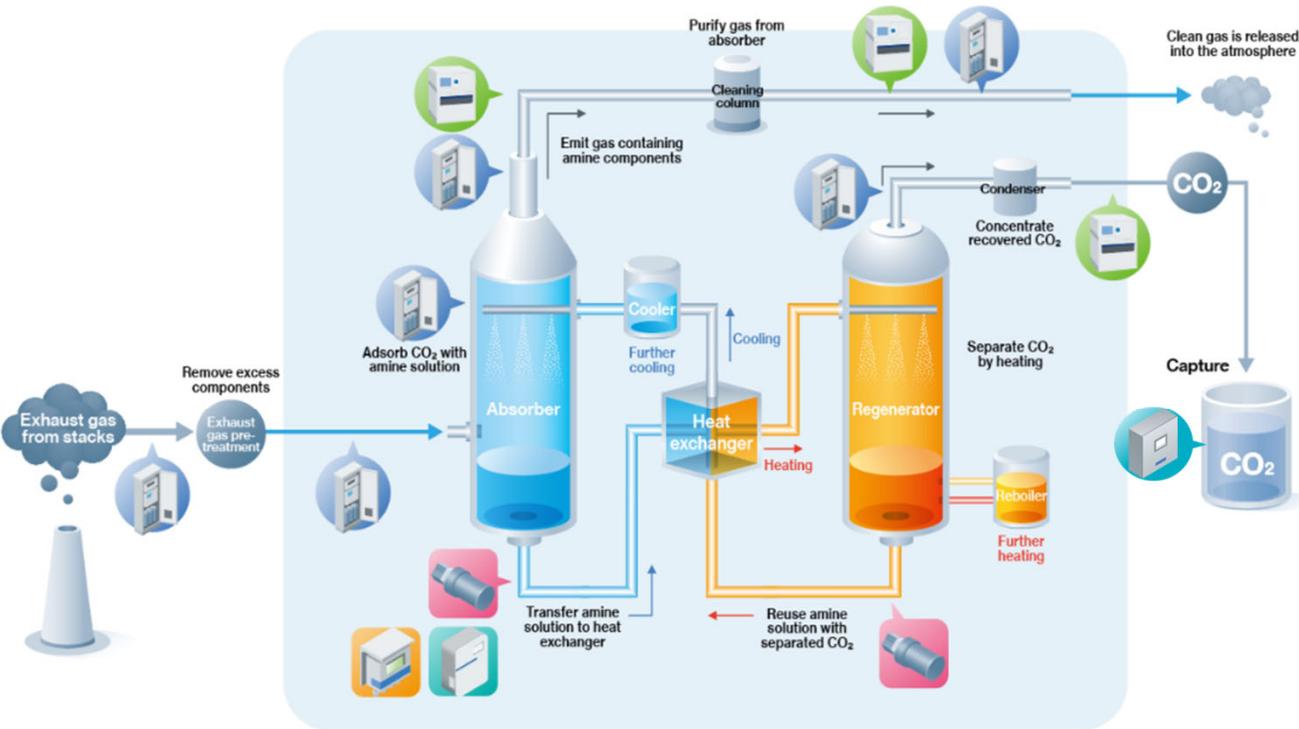
CO₂ capture technology and HORIBA solution

HORIBA's technology for CO₂ capture (Measurement / Evaluation / Monitoring / Control systems)

	Principle	Pros & Cons		R&D		Process	
		TRL	Target Cost	Principle / Performance	Analysis / Measurement / Evaluation	Plant / Systems	Detection / Monitoring / Management
In liquid Chemical absorption	 <p>Energy</p>	7~8	4000 (JPY/ton)	 <p>Amine (Adsorbed material)</p>	<ul style="list-style-type: none"> Evaluation of CO₂ absorption performance Analysis of deterioration factor Confirmation of equipment material conformity 		<ul style="list-style-type: none"> Monitoring of absorption liquid condition/ gas properties at the absorber/ stripper Confirmation of collected CO₂ purity
Collected Physical absorption	 <p>Pressure</p>		2000 (JPY/ton)	 <p>Other components CO₂ adsorption CO₂ capture</p>	<ul style="list-style-type: none"> Evaluation of CO₂, H₂S absorption performance Confirmation of optimum conditions for absorption liquid Confirmation of absorption inhibitors 		<ul style="list-style-type: none"> Monitoring of absorption liquid condition at the absorber/ stripper Confirmation of collected gas properties
Collected in solid Solid absorption	 <p>Energy</p>			 <p>Amine (Adsorbed material) + Porous Material</p>	<ul style="list-style-type: none"> Comparison/ Selection of adsorbed materials Confirmation/ Improvement for effect of exhaust gas composition/ moisture 		<ul style="list-style-type: none"> Monitoring of gas properties and CO₂ collection efficiency at the absorber/ stripper/ dryer Collection efficiency monitoring
Collected in solid Membrane separation	 <p>Pressure Membrane</p>	3~4	1000 (JPY/ton)	 <p>Supply side High Pressure Permeation side CO₂ Membrane Separator</p>	<ul style="list-style-type: none"> Analysis of molecular structure for membrane separator Confirmation of CO₂ permeation selectivity 		<ul style="list-style-type: none"> Monitoring of gas shift reaction Confirmation of separated gas properties at the outlet of membrane module

HORIBA solution for chemical absorption method

A variety of analyzers are required to achieve a highly efficient CO₂ separation and capture process



CO₂ separation / capture by **amine solution**

Gas

Stack gas analyzer
ENDA-5000 series



Gas measurement
in various process

Trace gas analyzer
APNA-380/CU2



Impurity gas
(amine etc.)
measurement

Process Laser
Gas Analyzer
PLGA-1000



NO, NO₂
measurement in
CO₂

Liquid

Probe Raman



Real-time monitoring
of amine solution
degradation

pH / Conductivity
analyzer
H-1 series



Easy monitoring the
status of amine
solution

TOC analyzer
T-1 series



CO₂ measurement
in amine solution

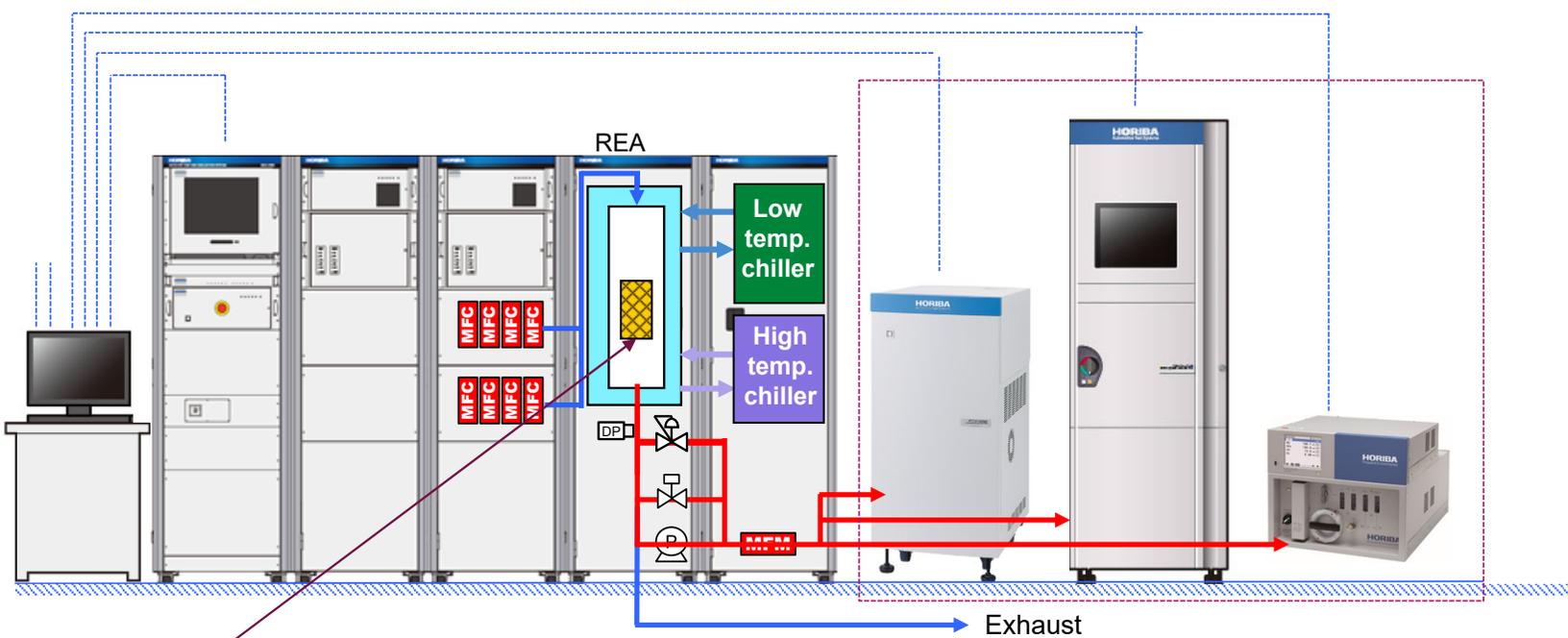
CO₂ capture technology and HORIBA solution

HORIBA's technology for CO₂ capture (Measurement / Evaluation / Monitoring / Control systems)

		Pros & Cons		R&D		Process	
		TRL	Target Cost	Principle / Performance	Analysis / Measurement / Evaluation	Plant / Systems	Detection / Monitoring / Management
Collected in liquid	Chemical absorption	7~8	4000 (JPY/ton)	<p>Amine (Adsorbed material)</p>	<ul style="list-style-type: none"> Evaluation of CO₂ absorption performance Analysis of deterioration factor Confirmation of equipment material conformity 		<ul style="list-style-type: none"> Monitoring of absorption liquid condition/ gas properties at the absorber/ stripper Confirmation of collected CO₂ purity
	Physical absorption		2000 (JPY/ton)	<p>Other components</p> <p>CO₂ adsorption CO₂ capture</p>	<ul style="list-style-type: none"> Evaluation of CO₂, H₂S absorption performance Confirmation of optimum conditions for absorption liquid Confirmation of absorption inhibitors 		<ul style="list-style-type: none"> Monitoring of absorption liquid condition at the absorber/ stripper Confirmation of collected gas properties
Collected in solid	Solid absorption			<p>Amine (Adsorbed material)</p> <p>+ Porous Material</p>	<ul style="list-style-type: none"> Comparison/ Selection of adsorbed materials Confirmation/ Improvement for effect of exhaust gas composition/ moisture 		<ul style="list-style-type: none"> Monitoring of gas properties and CO₂ collection efficiency at the absorber/ stripper/ dryer Collection efficiency monitoring
	Membrane separation	3~4	1000 (JPY/ton)	<p>Supply side</p> <p>High Pressure</p> <p>Permeation side</p> <p>CO₂ Membrane Separator</p>	<ul style="list-style-type: none"> Analysis of molecular structure for membrane separator Confirmation of CO₂ permeation selectivity 		<ul style="list-style-type: none"> Monitoring of gas shift reaction Confirmation of separated gas properties at the outlet of membrane module

Catalyst Evaluation System (SIGU, CCEVA)

Applied to CO₂ adsorbent material evaluation



CO₂ Adsorbent Material



<Evaluation Parameters>
 Concentration / Flow rate /
 Temperature / Pressure / Moisture



<Advantages of the Evaluation System>
 Labor saving, time reduction, and improved reproducibility through automation

Omoshiro-okashiku
Joy and Fun

おもしろおかしく

THANK YOU

Terima kasih
謝謝
Terima kasih
Danke
Tack ska du ha
Gracias
Σας ευχαριστώ πάρα πολύ
धन्यवाद
شُكْرًا
Obbrigado
Большое спасибо
Cảm ơn
Merci
감사합니다
Grazie
Dziękuję
ありがとうございました